NEUP Nuclear Energy University Programs

U.S. Department of Energy

2009 NEUP R&D

Project Number	Initiative	Title	Organization	PI	Collaborators
09-269	AFCI	*Fundamental Understanding of Ambient and High-Temperature Plasticity Phenomena in Structural Materials in Advanced Reactors*	Georgia Institute of Technology	Deo, Chaitanya	• McDowell, David - Georgia Institute of Technology • Zhu, Ting - Georgia Institute of Technology
09-475	AFCI	*Advanced Elastic/ Inelastic Nuclear Data Development Project*	Idaho State University	Wells, Douglas	• Chowdhury, Partha - University of Massachusetts, Lowell • Greife, Uwe - Colorado School of Mines • Hicks, Sally Fisher - University of Dallas • Hill, Tony - Los Alamos National Laboratory • Kawano, Toshihiko - Los Alamos National Laboratory • McEllistrem, Marcus T. - University of Kentucky • Slaughter, David M. - University of Utah • Tsvetkov, Pavel - Texas A&M University • Vanhoy, Jeffrey Rahn - United States Naval Academy
09-095	AFCI	*Heterogeneous Recycling in Fast Reactors*	Massachusetts Institute of Technology	Forget, Benoit	• Driscoll, Michael - Massachusetts Institute of Technology • Piet, Steven J. - Idaho National Laboratory • Pope, Michael - Idaho National Laboratory
09-144	AFCI	*Thermodynamic Development of Corrosion Rate Modeling in Iron Phosphate Glasses*	Missouri University of Science and Technology	Schlesinger, Mark	• Brow, Richard - Missouri University of Science and Technology
09-365	AFCI	*Development of Subspace-Based Hybrid Monte Carlo-Deterministic Algorithms for Reactor Physics Calculations*	North Carolina State University	Abdel-Khalik, Hany	• Gardner, Robin - North Carolina State University • Mattingly, John - Sandia National Laboratory • Sood, Avneet - Los Alamos National Laboratory
09-351	AFCI	*SiC Schottky Diode Detectors for Measurement of Actinide Concentrations from Alpha Activities in Molten Salt Electrolyte*	Ohio State University	Windl, Wolfgang	• Blue, Thomas E. - Ohio State University
09-416	AFCI	*Simulations of Failure via Three-Dimensional Cracking in Fuel Cladding for Advanced Nuclear Fuels*	Oklahoma State University	Lu, Hongbing	• Bardenhagen, Scott - Bardenhagen Consulting • Komanduri, Ranga - Oklahoma State University
09-247	AFCI	*Improvements to Nuclear Data and Its Uncertainties by Theoretical Modeling*	Rensselaer Polytechnic Institute	Danon, Yaron	• Nazarewicz, Witold - University of Tennessee • Prinja, Anil - University of New Mexico • Talou, Patrick - Los Alamos National Laboratory

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09-349	AFCI	*Sharp Interface Tracking in Rotating Microflows of Solvent Extraction*	State University of New York at Stony Brook	Glimm, James	• de Almeida, Valmor - Oak Ridge National Laboratory • Jiao, Xiangmin (Jim) - State University of New York at Stony Brook • Simms, Brett - Grambling State University
09-048	AFCI	*Bulk Nanostructured FCC Steels with Enhanced Radiation Tolerance*	Texas A&M University	Zhang, Xinghang	• Allen, Todd - University of Wisconsin, Madison • Hartwig, K.T. - Texas A&M University • Yang, Y. - University of Wisconsin, Madison
09-357	AFCI	*Fuel Performance Experiments and Modeling: Fission Gas Bubble Nucleation and Growth in Alloy Nuclear Fuels*	Texas A&M University	McDeavitt, Sean	• Kennedy, J. Rory - Idaho National Laboratory • Shao, Lin - Texas A&M University • Tsvetkov, Pavel - Texas A&M University • Wirth, Brian D. - University of California, Berkeley
09-408	AFCI	*Computational Design of Advanced Nuclear Fuels*	University of California, Davis	Savrasov, Sergey	• Haule, Kristjan - Rutgers University • Kotliar, Gabriel - Rutgers University
09-321	AFCI	*Data Collection Methods For Validation of Advanced Multi-Resolution Fast Reactor Simulations*	University of Idaho	Tokuhiro, Akira	• Momozaki, Yoichi - Argonne National Laboratory • Pointer, David - Argonne National Laboratory • Reed, Claude - Argonne National Laboratory • Ruggles, Art - University of Tennessee
09-185	AFCI	*Simulations of the Thermodynamic and Diffusion Properties of Actinide Oxide Fuel Materials*	University of Michigan	Becker, Udo	
09-221	AFCI	*Adsorptive Separation and Sequestration of Krypton, I and C14 on Diamond Nanoparticles*	University of Missouri, Columbia	Ghosh, Tushar	• Loyalka, Sudarshan - University of Missouri, Columbia • Prelas, Mark - University of Missouri, Columbia • Viswanath, Dabir S. - University of Missouri
09-315	AFCI	*Development of Alternative Technetium Waste Forms*	University of Nevada, Las Vegas	Czerwinski, Kenneth	• Fattahi, Massoud - Laboratoire Subatech • Forster, Paul - University of Nevada, Las Vegas • Hartmann, Thomas - University of Nevada, Las Vegas • Jarvinen, Gordon - Los Alamos National Laboratory • Kennedy, J. Rory - Idaho National Laboratory • Kolman, Dave - Los Alamos National Laboratory • Poineau, Frederic - University of Nevada, Las Vegas • Weck, Philippe - University of Nevada, Las Vega
09-350	AFCI	*Quantification of UV-Visible and Laser Spectroscopic Techniques for Materials Accountability and Process Control*	University of Nevada, Las Vegas	Czerwinski, Kenneth	• Bryan, Samuel - Pacific Northwest National Laboratory • Jubin, Robert - Oak Ridge National Laboratory • Paviet-Hartmann, Patricia - University of Nevada, Las Vegas • Regalbuto, Monica - Argonne National Laboratory
09-391	AFCI	*High-Fidelity Space-Time Adaptive Multiphysics Simulations in Nuclear Engineering*	University of Nevada, Reno	Solin, Pavel	• Ragusa, Jean - Texas A&M University
09-129	AFCI	*Advanced Mesh-Enabled Monte Carlo Capability for Multi-Physics Reactor Analysis*	University of Wisconsin, Madison	Wilson, Paul	• Brown, Forrest - Los Alamos National Laboratory • Clarno, Kevin - Oak Ridge National Laboratory • Evans, Thomas - Oak Ridge National Laboratory • Tautges, Tim - Argonne National Laboratory
09-225	AFCI	*Ab Initio Enhanced Calphad Modeling of Actinide Rich Nuclear Fuels*	University of Wisconsin, Madison	Morgan, Dane	• Allen, Todd - University of Wisconsin, Madison • Chang, Y. Austin - University of Wisconsin, Madison • Yang, Y. - University of Wisconsin, Madison
09-282	AFCI	*Development of Diffusion Barrier Coatings and Deposition Technologies for Mitigating Fuel Cladding Chemical Interactions (FCCI)*	University of Wisconsin, Madison	Sridharan, Kumar	• Allen, Todd - University of Wisconsin, Madison • Cole, James - Idaho National Laboratory • Yang, Y. - University of Wisconsin, Madison

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09-319	AFCI	*Thermal Properties of LiCl-KCl Molten Salt for Nuclear Waste Separation*	University of Wisconsin, Madison	Sridharan, Kumar	• Allen, Todd - University of Wisconsin, Madison • Anderson, Mark - University of Wisconsin, Madison • Simpson, Michael - Idaho National Laboratory
09-453	Gen IV	*Irradiation Creep in Graphite*	Boise State University	Ubic, Rick	• Butt, Darryl - Boise State University • Windes, Will - Idaho National Laboratory
09-347	Gen IV	*Modeling the Stress Strain Relationships and Predicting Failure Probabilities for Graphite Core Components*	Cleveland State University	Duffy, Stephen	
09-257	Gen IV	*TRISO-Coated Fuel Durability Under Extreme Conditions*	Colorado School of Mines	Reimanis, Ivar	• Butt, Darryl - Boise State University • Gorman, Brian P. - Colorado Center for Advanced Ceramics
09-396	Gen IV	*An Innovative and Advanced Coupled Neutron Transport and Thermal Hydraulic Method (Tool) for the Design, Analysis and Optimization of VHTR/ NGNP Prismatic Reactors*	Georgia Institute of Technology	Rahnema, Farzad	• Garimella, Srinivas - Georgia Institute of Technology • Ougouag, Abderrafi M. - Idaho National Laboratory • Zhang, Dingkang - Georgia Institute of Technology
09-030	Gen IV	*Removal of 14C from Irradiated Graphite for Graphite Recycle and Waste Volume Reduction*	Idaho State University	Dunzik-Gougar, Mary Lou	• Fachinger, Johannes - Forschungszentrum Jülich GmbH • Lalk, Jörg - Pebble Bed Modular Ltd • Marsden, Barry - University of Manchester • Windes, Will - Idaho National Laboratory
09-111	Gen IV	*Millimeter-Wave Thermal Analysis Development and Application to Gen IV Reactor Materials*	Massachusetts Institute of Technology	Woskov, Paul	• Sundaram, S. K. - Pacific Northwest National Laboratory
09-068	Gen IV	*Accurate Development of Thermal Neutron Scattering Cross Section Libraries*	North Carolina State University	Hawari, Ayman	• Dunn, Michael - Oak Ridge National Laboratory
09-097	Gen IV	*Understanding Creep Mechanisms in Graphite with Experiments, Multiscale Simulations, and Modeling*	North Carolina State University	Eapen, Jacob	• Burchell, Timothy - Oak Ridge National Laboratory • Mansur, Louis - Oak Ridge National Laboratory • Murty, K. Linga - North Carolina State University
09-288	Gen IV	*Multiaxial Creep-Fatigue and Creep-Ratcheting Failures of Grade 91 and Haynes 230 Alloys Toward Addressing the Design Issues of Gen IV Nuclear Power Plants*	North Carolina State University	Hassan, Tasnim	• Carroll, Laura J. - Idaho National Laboratory • Lissenden, Cliff J. - Pennsylvania State University
09-366	Gen IV	*Verification & Validation of High-Order Short-Characteristics-Based Deterministic Transport Methodology on Unstructured Grids*	North Carolina State University	Azmy, Yousry	• Ferrer, Rodolfo - Idaho National Laboratory
09-479	Gen IV	*Microscale Heat Conduction Models and Doppler Feedback*	North Carolina State University	Hawari, Ayman	• Ortensi, Javier - Idaho National Laboratory • Ougouag, Abderrafi M. - Idaho National Laboratory
09-522	Gen IV	*Optimizing Neutron Thermal Scattering Effects in Very High Temperature Reactors*	North Carolina State University	Hawari, Ayman	• Ougouag, Abderrafi M. - Idaho National Laboratory

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09-158	Gen IV	*Investigation of Countercurrent Helium-Air Flows in Air-Ingress Accidents for VHTRs*	Ohio State University	Sun, Xiaodong	• Christensen, Richard N. - Ohio State University • Oh, Chang - Idaho National Laboratory
09-346	Gen IV	*Testing of Performance of Optical Fibers Under Irradiation in Intense Radiation Fields, When Subjected to Very High Temperatures*	Ohio State University	Blue, Thomas E.	• Dickerson, Bryan - Luna Innovations • Fielder, Robert - Luna Innovations • Windl, Wolfgang - Ohio State University
09-320	Gen IV	*Non Destructive Thermal Analysis and In Situ Investigation of Creep Mechanism of Graphite and Ceramic Composites using Phase-Sensitive THz Imaging & Nonlinear Resonant Ultrasonic Spectroscopy*	Rensselaer Polytechnic Institute	Zhang, Xi-Cheng	• Han, Pengyu - Rensselaer Polytechnic Institute • Hurley, David H. - Idaho National Laboratory
09-341	Gen IV	*Investigation on the Core Bypass Flow in a Very High Temperature Reactor*	Texas A&M University	Hassan, Yassin	
09-464	Gen IV	*CFD Model Development and Validation for High Temperature Gas Cooled Reactor Cavity Cooling System (RCCS) Applications*	Texas A&M University	Hassan, Yassin	• Corradini, Michael - University of Wisconsin, Madison • Tokuhiro, Akira - University of Idaho
09-515	Gen IV	*Study of Air Ingress Across the Duct during the Accident Conditions*	Texas A&M University	Hassan, Yassin	• Ugaz, Victor - Texas A&M University
09-390	Gen IV	*Verification of the CENTRM Module for Adaptation of the SCALE Code to NGNP Prismatic and PBR Core Designs*	University of Arizona	Ganapol, Barry	
09-080	Gen IV	*Integral and Separate Effects Tests for Thermal Hydraulics Code Validation for Liquid-Salt Cooled Nuclear Reactors*	University of California, Berkeley	Peterson, Per	
09-113	Gen IV	*Mechanisms Governing the Creep Behavior of High Temperature Alloys for Generation IV Nuclear Energy Systems*	University of Cincinnati	Vasudevan, Vijay	• Carroll, Laura J. - Idaho National Laboratory • Sham, T.L. - Oak Ridge National Laboratory
09-312	Gen IV	*ALD Produced B2O3, Al2O3 and TiO2 Coatings on Gd2O3 Burnable Poison Nanoparticles*	University of Colorado, Boulder	Weimer, Alan	• King, David M. - University of Colorado, Boulder • Lichty, Paul - University of Colorado, Boulder • Rozewski, Eran - University of Colorado, Boulder
09-151	Gen IV	*Experimental Study and Computational Simulations of Key Pebble Bed Thermomechanics Issues for Design and Safety*	University of Idaho	Tokuhiro, Akira	• Cogliati, Joshua - Idaho National Laboratory • Ougouag, Abderrafi M. - Idaho National Laboratory • Potirniche, Gabriel - University of Idaho • Rink, Karl - University of Idaho
09-458	Gen IV	*Prediction and Monitoring Systems of Creep-Fracture Behavior of 9Cr-1Mo Steels for Reactor Pressure Vessels*	University of Idaho	Potirniche, Gabriel	• Barlow, III, Fred D. - University of Idaho • Charit, Indrajit - University of Idaho • Rink, Karl - University of Idaho

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09-516	Gen IV	*Understanding Fundamental Material Degradation Processes in High Temperature Aggressive Chemomechanical Environments*	University of Illinois, Urbana-Champaign	Stubbins, James	• Gewirth, Andrew A. - University of Illinois, Urbana-Champaign • Sehitoglu, Huseyin - University of Illinois, Urbana-Champaign • Sofronis, Petros - University of Illinois, Urbana-Champaign
09-304	Gen IV	*Multi-Scale Multi-Physics Methods Development for the Calculation of Hot-Spots in the NGNP*	University of Michigan	Downar, Thomas	• Knoll, Dana - Idaho National Laboratory • Martin, William - University of Michigan • Seker, Volkan - University of Michigan
09-354	Gen IV	*Corrosion and Creep of Candidate Alloys in High Temperature Helium and Steam Environments for the NGNP*	University of Michigan	Was, Gary	• Jones, J. Wayne - University of Michigan • Pollock, Tresa - University of Michigan
09-511	Gen IV	*Creation of a Full-Core HTR Benchmark with the Fort St. Vrain Initial Core and Validation of the DHF Method with Helios for NGNP Configurations*	University of Michigan	Martin, William	• Baxter, Alan - General Atomics • Lee, John C. - University of Michigan • Wemple, Chuck - Studsvik-Scandpower
09-376	Gen IV	*Fission Product Sorptivity in Graphite*	*University of Missouri, Columbia*	Tompson, Robert	
09-075	Gen IV	*Identifying and Understanding Environment-Induced Crack Propagation Behavior in Ni-Based Superalloy INCONEL 617*	University of Nevada, Las Vegas	Ma, Longzhou	• Ballinger, Ronald - Massachusetts Institute of Technology
09-417	Gen IV	*Graphite Oxidation Simulation in HTR Accident Conditions*	University of New Mexico	El-Genk, Mohamed	• Lommers, Lewis - AREVA • Mays, Brian - AREVA • Tournier, Jean-Michel - University of New Mexico
09-510	Gen IV	*Tritium Sequestration in Gen IV NGNP Gas Stream via Proton Conducting Ceramic Pumps*	University of South Carolina	Chen, Fanglin (Frank)	• Adams, Thad M. - Savannah River National Laboratory • Brinkman, Kyle - Savannah River National Laboratory • Reifsnider, Ken - University of South Carolina
09-116	Gen IV	*Materials, Turbomachinery and Heat Exchangers for Supercritical CO_2 Systems*	University of Wisconsin, Madison	Anderson, Mark	• Allen, Todd - University of Wisconsin, Madison • Corradini, Michael - University of Wisconsin, Madison • Nellis, Greg - University of Wisconsin, Madison • Wright, Stephen - Sandia National Laboratory
09-202	Gen IV	*Experimental Studies of NGNP Reactor Cavity Cooling System with Water*	University of Wisconsin, Madison	Corradini, Michael	• Anderson, Mark - University of Wisconsin, Madison • Hassan, Yassin - Texas A&M University • Tokuhiro, Akira - University of Idaho
09-237	Gen IV	*Assessment of Embrittlement of VHTR Structural Alloys in Impure Helium Environments*	University of Wisconsin, Madison	Crone, Wendy	• Allen, Todd - University of Wisconsin, Madison • Cao, Guoping - University of Wisconsin, Madison • Sridharan, Kumar - University of Wisconsin, Madison
09-241	Gen IV	*A Distributed Fiber Optic Sensor Network for Online 3-D Temperature and Neutron Fluence Mapping in a VHTR Environment*	Texas A&M University	Bragg-Sitton, Shannon	• Bertch, Timothy - General Atomics • Dickerson, Bryan - Luna Innovations • Fielder, Robert - Luna Innovations • McEachern, Donald - General Atomics • Ougouag, Abderrafi M. - Idaho National Laboratory • Sang, Alex - Luna Innovations • Tsvetkov, Pavel - Texas A&M University
09-245	Gen IV	*Modeling Fission Product Sorption in Graphite Structures*	University of Wisconsin, Madison	Szlufarska, Izabela	• Allen, Todd - University of Wisconsin, Madison • Morgan, Dane - University of Wisconsin, Madison

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09-274	Gen IV	*Liquid Salt Heat Exchanger Technology for VHTR Based Applications*	University of Wisconsin, Madison	Anderson, Mark	• Allen, Todd - University of Wisconsin, Madison • Peterson, Per - University of California, Berkeley • Sridharan, Kumar - University of Wisconsin, Madison
09-323	Gen IV	*Effect of Post-Weld Heat Treatment on Creep Rupture Properties of Grade 91 Steel Heavy Section Welds*	Utah State University	Li, Leijun	
09-081	IIR	*Neutron Damage and MAX Phase Ternary Compounds*	Drexel University	Barsoum, Michel	• Hoffman, Elizabeth - Savannah River National Laboratory • Kohse, Gordon - Massachusetts Institute of Technology • Sindelar, Robert - Savannah River National Laboratory
09-267	IIR	*Atomistic Calculations of the Effect of Minor Actinides on Thermodynamic and Kinetic Properties of* UO_2+x	Georgia Institute of Technology	Deo, Chaitanya	• Andersson, David - Los Alamos National Laboratory • Battaile, Corbett - Sandia National Laboratory • Uberuaga, Blas - Los Alamos National Laboratory
09-040	IIR	*Maximum Fuel Utilization in Fast Reactors without Chemical Reprocessing*	University of California, Berkeley	Greenspan, Ehud	• Vujic, Jasmina - University of California, Berkeley
09-456	IIR	*Developing a High Thermal Conductivity Fuel with Silicon Carbide Additives*	University of Florida	Baney, Ronald	• Tulenko, James - University of Florida
09-477	IIR	*Fabrication of Tungsten-Rhenium Cladding Materials via Spark Plasma Sintering for Ultra High Temperature Reactor Applications*	University of Idaho	Charit, Indrajit	• Butt, Darryl - Boise State University • Carroll, Mark - Idaho National Laboratory • Frary, Megan - Boise State University
09-537	IIR	*Ionic Liquid and Supercritical Fluid Hyphenated Techniques for Dissolution and Separation of Lanthanides, Actinides, and Fission Products*	University of Idaho	Wai, Chien	• Mincher, Bruce - Idaho National Laboratory
09-414	IIR	*Improved Fission Neutron Data Base for Active Interrogation of Actinides*	University of Michigan	Sara Pozzi	• Cziir, J. Bart - Photogenics • Haight, Robert - Lost Alamos National Laboratory • Kovash, Michael - University of Kentucky • Tsvetkov, Pavel - Texas A&M University
09-285	IIR	*Utilization of Methacrylates and Polymer Matrices for the Synthesis of Ion Specific Resins*	University of Nevada, Las Vegas	Czerwinski, Kenneth	• Rego, Daniel B. - University of Nevada, Las Vegas • Weck, Philippe - University of Nevada, Las Vegas
09-519	IIR	*Improved LWR Cladding Performance by EPD Surface Modification Technique*	University of Wisconsin, Madison	Corradini, Michael	• Anderson, Mark - University of Wisconsin, Madison • Sridharan, Kumar - University of Wisconsin, Madison
09-196	LWRS	*Advanced Models of LWR Pressure Vessel Embrittlement for Low Flux-High Fluence Conditions*	University of California, Santa Barbara	Odette, G. Robert	• Nanstad, Randy K. - Oak Ridge National Laboratory • Wirth, Brian D. - University of California, Berkeley • Yamamoto, Takuya - University of California, Santa Barbara